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THE DEMAND AND SUPPLY CON-
CEPTS. AN INTRODUCTION TO
THE STUDY OF MARKET PRICE

A DISSERTATION

SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL OF ARTS
AND LITERATURE IN CANDIDACY FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY

(DEPARTMENT OF POLITICAL ECONOMY)

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ROBERT F. HOXIE

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THE DEMAND AND SUPPLY CONCEPTS: AN INTRO-
DUCTION TO THE STUDY OF MARKET PRICE

The present work has been undertaken in the belief that the existing status of economic theory calls urgently for the restatement of economic concepts and for the revision of fundamental economic problems. In the world of business and industry most essential changes have been wrought out in the past half-century. The rapid subjugation of nature by social forces; the growing predominance of the pecuniary or acquisitive over industrial motivation; the progressive concentration of pecuniary authority and discretion as illustrated in the development of monopolies and in the increasing directive power of small groups of financial agents; the growing importance of the time element in economic activity resulting from the roundaboutness of the modern industrial process and a transition from money to credit economy¹—

¹The purposes of this introduction forbid more than this bare reference to the revolutionary forces in contemporary economic life. These forces and their implications have recently been treated at considerable length by writers of repute, and notably by Americans. The distinction between the pecuniary and industrial motives and the implications of this distinction are considered by Dr. Thorstein B. Veblen in his recently published *Theory of Business Enterprise* (Scribner's, 1904). This work also contains a suggestive chapter on "The Use of Loan Credit in Modern Business," which is practically reprinted from the "Decennial Publications of the University of Chicago," First Series, Vol. IV, p. 31. The distinction between pecuniary and industrial is brought out also by Dr. Werner Sombart in *Der moderne Capitalismus* (Leipzig, 1902). The implications of the time element have been systematically considered by Dr. Frank A. Fetter in *The*

these and other manifestations of economic development have, especially of late, altered in some of its fundamental aspects the material of economic speculation.

In the world of science the half-century has wrought equally essential changes which seem also to require readjustment in the field of economic theory. The evolutionary point of view has become firmly established, and has revolutionized men's notions in regard to the essential nature of scientific problems and scientific method. Sciences under its influence no longer concern themselves primarily with the normal, the typical, the abstract, but tend to recognize only the concrete and the actual; they are no longer content to ask what and how, but increasingly demand to know *why*; they are no longer satisfied to find answers to their queries in morphological classification and in mechanical equilibrium of present but abstract forces, but demand solutions of scientific problems in terms of the life-story of concrete material. In short, in obedience to the evolutionary spirit, there has been a notable tendency in modern science to abandon abstract material for concrete; classification in terms of present form and function for classification in terms of genesis and process; static for dynamic problems; mechanical solutions for solutions in terms of cumulative change.²

Principles of Economics (Century, 1904), and also in the following recent contributions to periodical literature: "Recent Discussions of the Capital Concept," *Quarterly Journal of Economics*, Vol. XV, p. 1; "The Next Decade of Economic Theory," *Publications of the American Economic Association*, Third Series, Vol. II, p. 236; "The Roundabout Process in the Interest Theory," *Quarterly Journal of Economics*, Vol. XVII, p. 163; "Relations between Rent and Interest," *Publications of the American Economic Association*, Third Series, Vol. V, p. 176. To Böhm-Bawerk should be given credit for initiating the scientific discussion of the time element in economics. See his *Positive Theory of Capital*, Book V. Several writers have of late considered the monetary implications of the modern development of credit, but special recognition in this field should be accorded to Professor J. Laurence Laughlin. His main work in this connection is to be found in *The Principles of Money* (Scribner's, 1903), in the *Final Report of the Monetary Commission of the Indianapolis Convention*, 1898, and in a paper on "Credit" contributed to the *Decennial Publications of the University of Chicago*, First Series, Vol. IV, p. 1.

² The citation of specific authority in proof of these statements hardly seems to be required. The whole body of work in the field of biology under the Darwinian impulse substantiates what is here said.

To the influence of this dual revolution in fact and thought economics has been slow to respond. Economists indeed, almost *en masse*, have seemed to feel the need of theoretical readjustment, but, with a few notable exceptions, efforts in this direction have been relatively ineffective. The progressive revolution in the economic organization has been met in general by theoretical repairs merely, such as are implied in perfunctory distinctions like that between private and social capital, in greater emphasis on the element of "friction" in connection with the "normal" competitive activity and results, in recognition of the more obvious monetary implications of the growing importance of credit. The revolution in scientific thought has in general produced in the field of economic reasoning nothing more serious than harmless diversions, such as are represented by emphasis on the relativity of economic percepts, erudite discussion of the evolution of terminology, and introductory essays on the growth of modern industry. In fact, the great body of generally accepted economic theory seems to have remained essentially unmodified by the recent progressive revolution both in science and economy.

If proof and illustration of this statement are needed, they may be found in the current conception and solution of any typical problem in the field of economic theory. Take, for example, the problem of wages. Whether the view of the classical English writers, or that of the Austrian school, or of the group of eclectic writers best represented by Alfred Marshall, be taken, the wage question is considered altogether as a static problem, its solution is undertaken solely by the method of equilibrium of forces, and the analysis of the conditions which determine wages shows a defective, and one might almost say an archaic, conception of the present-day economic situation.

The slightest consideration seems sufficient to justify the last of these charges. In spite of the splendid development of monopoly conditions, and the widespread organization of employers and laborers, the normal wage-rate is still taken to be one fixed by free and individual competition. In face of the evident pecuniary authority and discretion of the business undertaker, and the progressive concentration of this authority, indus-

trial initiative and discretion are still supposed to reside in the laborer equally with the employer; where efficiency is supposed to constitute a condition determining wages, practically no distinction is made between efficiency which is industrial and that which is merely pecuniary; and, notwithstanding the universal recognition of the roundaboutness of the typical modern industrial process, orthodox³ doctrine contains hardly the beginnings of an adequate consideration of the time element in relation to wages. In short, in the analysis of the conditions which govern the fixing of wages the essential and fundamental factors of modern economy are very largely ignored. The economic organization which is taken as contemporary by these schools of thought is one which existed, or was supposed to exist, in an earlier economic era. This is true not merely in relation to the wage question, but to economic problems generally.

A somewhat more detailed consideration is necessary to show that the wage problem, in the view of orthodox economics, is static merely, and that it is solved solely by the method of equilibrium. If we analyze the wage discussions of these dominant schools of economic thought, we find that in the case of all of them the central conception is that of a normal wage; this wage is not any definite or concrete or historical thing, but is admittedly an abstraction; the problem as conceived is not what is this normal wage, or how does it progressively vary, but what are the general and abstract forces that determine it; the solution of the problem is sought in the examination of conditions that are supposed normally to govern the strength of opposing forces; and finally the wage problem, so far as considered, is solved, when, the strength of opposing forces having been demonstrated, the abstract conditions of stable equilibrium have been determined.

The essential truth of this analysis will be at once recognized if we sketch, with a few conventional strokes, the rough outlines of the actual wage doctrine held by these dominant economic schools. All three seek to establish the universal law of wages; in other words, to show how wages in the abstract are deter-

³ The term "orthodox" is here used as a convenient one to represent the ideas of any of the schools of thought mentioned above.

mined; all, in one way or another, subscribe to the doctrine that wages are determined by the operation of forces essentially described in the terms "utility" and "cost;" all examine the conditions and forces that normally underlie and determine manifestations of utility and cost; all find the normal wage to be a resultant of stable equilibrium of the opposing forces underlying the utility and cost phenomena; and, though all discuss to some degree the variation of actual from normal wages, this variation is also discussed in terms of the conditions that underlie these opposing forces. Evidently the differences between the adherents of these schools, which for half a generation have formed the backbone of economic controversy, have been merely disagreements as to the proper analysis and classification of the forces representing utility and cost, and as to the relative emphasis that should be placed on these determining forces. The classical economists emphasized cost, and classified the forces representing cost and utility as conditions of supply; the Austrians placed the greater emphasis on utility, and chiefly classified under the heading of demand; the eclectics abandon emphasis and strive to utilize both classifications.

It is apparent that these differences do not touch the fundamental conceptions of the nature of the problem and the method to be employed in its solution. The problem as conceived is static in its nature; the method of solution is the method of equilibrium. Moreover, it is clear that the current tendency to abandon the crude hedonistic conception of economic motive, and to recognize that man's economic action is, in part, habitual if not instinctive, altruistic and constrained, admirable as it may be, does not essentially alter this conception of problem or method; nor is this alteration achieved by the tendency to a more ultimate analysis of the conditions that underlie utility and cost in social, institutional, or even in historical terms. In short, among the adherents of the present dominant schools of economic thought there is in the solution of this problem no attempt to adopt the evolutionary standpoint. And this attitude in regard to the problem of wages is general and typical.

In the examination of this typical economic problem, then,

we find ample proof that contemporary economics ignores both the evolutionary point of view and the most essential results of recent economic development. In other words, we find that orthodox economists have devoted themselves exclusively to what might be called, in the broadest sense of the term, classification; that this classification has been exclusively in terms of present and non-evolutionary data, and that classification even in these terms has been altogether incomplete and defective.

It seems clear, therefore, that the existing status of economic theory calls urgently for the restatement of economic concepts and for the revision of fundamental economic problems. But we have now to ask what is the nature of the restatement and revision which are needed. Quite evidently it is most essential that the facts of modern business and industry should be correctly apprehended. Evidently economics, dealing, as it does, with a developing material, cannot ignore its dynamic problems and the method of genesis and process. It must strive to become an evolutionary science. Finally, it is evident that if economics is to deal with static problems by the method of equilibrium—in other words, in the broadest sense of the term to classify its material in terms of present form and function—its classification must be true to the modern economic situation. The only question at all in doubt is this: Must economics, in response to the modern scientific spirit, cease to concern itself with classification on the basis of present form and function, and with the problems of social statics? In other words, must it abandon its present aim and method?

The answer to this question should undoubtedly be in the negative. The contrary notion seems to be based on the analogy between economics and the biological sciences. But does the acceptance of this analogy really require an affirmative answer to the question just stated? In reality, it does not. Indeed, when carefully considered, it seems not only to justify, but positively to emphasize, the need for continuous activity in the field of economic statics. That the static problems cannot be ignored is shown by the fact that those sciences which are most completely dominated by the evolutionary ideal have not succeeded in freeing

themselves entirely from the problem of classification in terms of existing data.⁴ This fact results from the nature of scientific investigation, which, before it can ask the question *why* in evolutionary terms, must, provisionally at least, answer the question *what*. And whatever may be the ultimate relation of these problems,⁵ practically their solutions constitute two relatively distinct scientific aims. In the very nature of things, that is to say, there

⁴In a paper on "The Empirical Method of Economic Instruction," published in the *Journal of Political Economy*, Vol. IX, No. 4 (September, 1901), on pp. 486, 487, the writer attempted to characterize the biological sciences in these words: "We have seen that these sciences aim in general to present systematic accounts in causal terms of groups of facts whose relationships are subject to cumulative change. Now, the changes of relationships which these sciences have to consider are of two general kinds: (1) within the group there is a definite, regularly repeated process of change which may be termed the life-process; and (2) the group itself is undergoing a definite progressive change, in general, from a simple to a more complex organism or organization. Such being the case, these sciences, in furtherance of the general scientific aim, have evidently two main objects. These are, first, to give systematic and causal accounts of the organisms or organizations as they are, and, secondly, to give systematic and causal accounts of the processes of development of these organisms or organizations.

"The attainment of the first of these ends involves three logically distinct lines of study: (1) a study of the forms of the organism or organization; (2) a study of the life-processes going on within the organism or organization; and (3) classifications of these forms and processes. The attainment of the second aim involves the same lines of study, historically and comparatively, with special reference to the forces at work tending to modify structure of organism or organization and the processes going on within. This analysis of the scientific aim in connection with the material involved gives us the logical division of the sciences belonging to the [organic group]. That the analysis is essentially correct is evidenced by the fact that these divisions do in fact correspond to the essential divisions of complete organic sciences. Thus botany comprehends, first, morphology (including histology), physiology, and systematic botany, or study of form and process leading to classification, and, secondly, a number of lines of study intended to lead to a genetic account of plant life. This second group of studies is better worked out in zoölogy, where we have phylogeny, a study of the origin of species; ontogeny, a study of the origin of individuals; embryology, paleontology, studies of the progressive development of individuals, etc."

⁵Of course, in a sense, the second of these problems is included in the first, since the organism, as it is, is a product of the past development, and can be completely understood only in the light of this development. But assuming the present situation as it is—i. e., simply as having become—then we may, for convenience, without scientific inaccuracy, separate its study into an account of the life-processes now going on within the organism in terms of causes now operating, and a causal account of the genesis of this organism.

must be in economic study these two classes of problems—the static and dynamic, each with its appropriate method.

Economics, then, in failing to adopt the evolutionary viewpoint, has not gone fundamentally wrong. It has merely lagged behind the biological sciences. The reason for this is plain and impersonal. It is that, compared with these sciences, the problems of classification and of the life-process in economics are exceedingly complex and shifting. This very reason, however, emphasizes not only the necessity for continued and vigorous prosecution of the static economic problems, but also the imperative need of progressive restatement and resolution of these problems, if they are intelligently to present and interpret the contemporaneous facts of everyday life. Intelligent solution of many of these static problems we have not at present, hence the present need of theoretical revision.

It would be an error, however, to suppose that the immediate need of the science is merely reclassification in terms of present data and review of the present life-process in the economic field. The truth is that, for the healthy growth of economics, the static and dynamic problems must be developed contemporaneously; for, as we have endeavored to show, the question *why* must wait upon the answer to the question *what*. But, on the other hand, it is undoubtedly true that a potent reason for the inadequate and archaic view which present-day economics prevailingly presents of the facts of modern economy results very largely from a failure to attempt a solution of the problems of economic evolution.

What we really need, then, in economics is both fundamental revision of old static concepts and problems, and an advance on new and dynamic ones. The imperative character of the latter work seems almost self-evident. In the present state of economics, however, it does not seem altogether unreasonable to regard revision of static problems as equally imperative. It is only necessary that in carrying on this labor we should not naïvely imagine, as economists have been wont to do, that we are engaged in the only, or in the ultimate, work of the science. We should never forget that the ultimate aim of organic science in this day

and age is to interpret life, not in the abstract, but in the concrete, and not in terms of being, but in terms of becoming.

The foregoing considerations perhaps sufficiently justify at the present time a somewhat detailed and technical discussion of the problem of market-price determination. This problem is obviously the kernel of static economic theory. Any attempt, therefore, at its re-resolution more in harmony with the facts of the actual pecuniary and industrial life about us cannot be utterly devoid of worth in connection with that general revision of static economic doctrine which seems so desirable. There is, moreover, a special reason for attacking this problem boldly and vigorously. Nowhere else in economic theory perhaps has controversy raged so continuously and fiercely. As a result, discussion of this most practical and primary problem has tended to become doctrinaire and partisan. The significance of the rapid and essential change in modern economy has been overlooked, and the intelligent study of secondary theoretical problems delayed and hampered. There seems, then, to be a real need for the study of market price frankly as a static problem and frankly by the method of equilibrium; that is to say, study simply and solely of the process by which price in the abstract is fixed in the market; a study, moreover, which shall attempt to include all the essential forces that contribute to price determination under the actual conditions of present-day economy. Such a study the following work is intended to be.

Conceived in this manner, market price appears as a resultant of the opposing forces, demand and supply. And, thus conceived, the problem naturally subdivides itself into a number of distinct, but organically related, inquiries. First, it seems necessary to inquire into the more objective nature of the demand and supply concepts; that is, to establish the general or universal characteristics of these phenomena under modern economic conditions. But it is evident that the demand and supply which actually determine price are not general but specific phenomena operating in a market; and when this is clearly apprehended, the suspicion is aroused that the specific character of demand and supply may

vary in different markets. We find ourselves then, secondly, committed to a study of the general and specific nature of markets, and the specific characteristics of market demand and supply. The character of demand and supply having been thus determined, we naturally proceed, thirdly, to the objective study of the market process; that is, to the actual process by which, under various conditions, demand and supply (if at all) in the first instance determine price. The consideration of these three topics constitutes what might be termed the objective or descriptive study of market price, and simply prepares the way for an examination of the nature and operation of the forces which underlie and determine price-fixing. This work would naturally begin with the immediate subjective explanation of the demand and supply phenomena and the objective market process as it has been shown to exist; that is to say, a study of what might be termed the subjective mechanics of the price problem. There would then follow, naturally, a study of the ultimate determinants of demand, a study of the ultimate determinants of supply, and a final summing up of the essential and ultimate determinants of market price.

The discussion which here follows is devoted entirely to the consideration of the first of the logical market-price inquiries named above—that is to say, to an inquiry concerning the general characteristics of the demand and supply concepts. In this discussion, the aim is to build up an adequate schematic representation of demand and supply in their general character of market-price determinants, and in conformity with the actual, but more general conditions of modern economy. That the current treatment of the matter is, on the whole, unsatisfactory seems the result of two main causes—failure to view demand and supply distinctly and consistently as market-price determinants, and, secondly, failure to realize that the essential characteristics of demand and supply have possibly been altered and augmented as modern economy has developed. In our work, therefore, of schematic construction the main specific tasks will be to assemble in orderly manner the demand and supply characteristics current in economic thought, where necessary, to restate these charac-

teristics carefully from the view-point of the price problem, and to discuss the effect upon the demand and supply concepts of the essential development of recent economy. This work will be with design both impersonal and non-historical. In harmony with what was said earlier in this introduction, it is believed by the writer that the work here to be done cannot be materially furthered by the erudite discussion of the evolution in economic literature of the demand and supply concepts.

I

Extreme difficulty is inherent in any attempt to abstract from the shifting mass of material and immaterial happenings of everyday life, and to characterize clearly, distinct classes of economic phenomena. This difficulty is emphasized, in the case of demand and supply, by special ambiguities connected with the ordinary use of the terms. It will be well, therefore, at the outset of this study, in order to avoid unnecessary difficulties, to remove as far as possible the ambiguities by making clear in what sense these terms are to be used. It is possible to distinguish in economic discussion two quite different uses of the terms "demand" and "supply." In one case, these terms are employed in a general philosophical sense to indicate the essential nature of demand and supply as such. An example of this usage is where it is said that demand and supply are identical—two sides of the same shield—in order to indicate that goods which are offered for other goods are at the same time the objects of offer in terms of other goods. Or, where similar language is used, to indicate that in the exchange of two commodities the buyer of either good is at the same time the seller of the other, and vice versa. In the other case, these terms are employed, in a much narrower and more specific way, to indicate the demand for and supply of any single commodity, as when it is said, for example, that at a given price the demand for a certain commodity exceeds its supply.

These two uses of demand and supply should not be confused. In which of these senses the terms should be employed at any time obviously depends upon the nature of the problem in hand. In the present instance the main objective is the study of the con-

ditions which determine market price in the specific but abstract case. It is, in the latter sense, therefore, as distinct market phenomena causally related to the price of a single definite good that the terms "demand" and "supply" are to be employed in this thesis. To determine the general characteristics of demand and supply, thus definitely conceived, is our specific problem. In order to judge of the truth of what follows, this fact must be kept carefully in mind.

Furthermore, conceived thus as specific market phenomena, demand and supply may be either total or individual. To avoid possible confusion arising out of the frequent practical necessity, in the course of the discussion, for reasoning in terms of both these aspects of demand and supply, it will be well here to state our conception of their mutual relations. This will involve a provisional and rough description of the market. Provisionally, then, we may describe the market where the price of any commodity is fixed, as composed of an indefinite number of competitively related individuals belonging to two classes—those who are engaged, or are supposed to be engaged, in offering the good in question for sale, and those who are engaged, or are supposed to be engaged, in making offers to purchase the good. For our present purposes it is not necessary to decide whether all the individuals offering and making offers in such a competitive group, or whether only certain of them, make up the actual market group. In either case, each of the individuals belonging to the first class, and who is in the market, contributes a supply of the goods, and the total market supply is evidently the sum of the supplies offered by all the individuals in the market. In the same manner we may describe the total market demand for the commodity as the sum of the demands of all the individuals in the market. In short, total market demand and total market supply are made up of individual market demands and supplies. It follows that the laws which underlie and determine individual demand and supply in any market also underlie and determine total demand and supply in the same market. No error, then, will be involved in reasoning from the laws of individual demand

and supply to total demand and supply. This we shall have frequent occasion to do.⁶

Having now disposed as far as possible of the ambiguities with which our problem is beset, we may proceed, without further delay, to the determination of the general character of the market demand and supply.

It is to be noted then, first, that demand and supply, as price determinants, are distinct and mutually exclusive phenomena. This statement is, to all intents and purposes, axiomatic. But it seems necessary, not only to state, but to emphasize, this self-evident fact, because of the quite general assumption in economic literature to the contrary. This assumption obviously results from the failure to differentiate clearly demand and supply as specific price determinants from these phenomena in the more general sense. When this differentiation is made, it is at once clear that to assert the identity of demand and supply as market phenomena is practically to deny the existence of the price problem, since it evidently constitutes a denial of the whole process of market adjustment from which price is supposed to emerge. Clearly, then, as determinants of price of a single but abstract market commodity, demand and supply must be conceived as distinct and mutually exclusive.

But, secondly, though distinct and exclusive phenomena, demand and supply in any specific case stand in reciprocal relation to the same commodity, and are to be expressed in terms of the commodity concerned. The main proposition which underlies all demand and supply discussion from our present viewpoint is: The market price of a commodity is determined by the demand and supply of *it*. It is a subtle reintroduction of the more general conception of demand and supply, and therefore of the elements of ambiguity and confusion, to express the supply of a good as so many units of it, and the demand for it as so many units of some second commodity. We may not be willing to subscribe to the proposition that price is fixed when the quantity demanded is equal to the quantity supplied. Yet we all feel that

⁶ The term "market" will frequently be used in the abstract and generic, rather than in the specific, sense.

this orthodox proposition is worthy of consideration. But the statement would be quite meaningless were the quantities referred to not quantities of the same good. Consider the absurdity of the statement, in a market where bushels of apples are exchanging for hundred-weights of coal, that the price of apples is fixed where the quantity of apples is equal to the quantity of coal. Evidently, if demand and supply are forces whose relationship determines price in the market, they must be strictly comparable. This they cannot be unless they are qualitatively identical.

The principle here contended for is not really violated when demand and supply are immediately expressed in terms of different commodities, provided an assumption is made by means of which the diverse expressions may be reduced to terms of the same character. This is illustrated when, in current discussion, supply is expressed in bushels, and demand in dollars at a certain price per bushel—when, for example, the supply is taken as ten bushels, and the demand is expressed as five dollars on the assumption of a one dollar price per bushel. This evidently is but a roundabout way of saying that the supply is ten bushels, and the demand under the conditions assumed is five bushels. In the interest of clearness, however, such methods of expression should give place to the direct statement of demand and supply in terms of the commodity whose price is to be determined.

Thirdly, though demand and supply are necessarily expressed in terms of quantity of what is usually a physical commodity, they are not to be regarded as physical phenomena merely. This is quite evident in the case of demand; for, as demand must be expressed in terms of the good concerned, to make it physical would be to make the commodity constitute its own demand. On the other hand, demand is not merely psychological—not merely desire. In the end, physical or objective goods must be offered in payment for the commodity demanded. There is no real demand, no effective price-determining force, in offers that are not backed, or believed to be backed, by goods—in offers that represent desire merely. What, then, is the relationship of the subjective and the

objective elements in demand? Which is the essential and determining element?

A little consideration shows that it is not the physical or objective element. Grant that demand cannot be effective without the offer or the willingness to offer for the good in question some other commodity or commodities in the market. The question at once arises: What other commodity? Evidently not all other commodities in the market will stand in this relation to any one good. And equally evident is it that mere physical or inherent characteristics do not mark off those goods which are from those which are not offered for any given commodity. We are driven, then, to assume that the determining quality of demand in any specific case is not physical, but psychological. That which determines that one good shall be offered in exchange for another is in fact the psychic attitude, the state of desire, of the putative owners or possessors of the so-called "demanding" goods—the desire which they have, on the one hand, for the good whose demand is in question, coupled with the desire which they have for the goods in terms of which they must make offer and payment.

Desire, then, is the essential element of demand: the physical is at best merely a limiting factor. And even this is perhaps laying too much stress upon the physical element. For those who will observe the market must recognize that the effective demand which may be exerted for a good by those who are bidding for it is not limited by the physical goods over which they can assert the title of ownership, or which are in their possession. So long as any bidders can convince suppliers of the good in question that they will be able at the end of an acceptable period to produce acceptable means of payment, their bids constitute demand, though they may not, at the time, control a single physical unit of the commodity or commodities in which payment is to be made. It is not, then, the actual amount of physical or objective goods that can be given for a commodity that limits the demand for it in the market, but the amount which bidders are able to convince prospective sellers of the commodity that they are willing and able to pay for it. Nor is this willingness and ability which limit

demand necessarily measured by the actual bids of prospective purchasers in the market. It cannot be too strongly emphasized that it is the *imputed* willingness and ability to take and pay for a commodity that limits the demand for it. The generally accredited rumor that an astute financier is secretly bidding, or about to bid, for ten thousand shares of a certain stock, in order to reap the benefit of a rumored increase in earning power which they represent, will often just as effectively increase the demand and raise the price of this stock as though he actually stood in the market place and evidenced his willingness and ability by actual bids.

Demand for a good, then, is a compound of elements which are partly subjective and partly objective. It is, on the one hand, a desire or willingness, real or imputed, on the part of prospective purchasers to take the good from the market, and, on the other hand, an ability, real or imputed, of these prospective purchasers to make to prospective sellers the necessary and satisfactory objective payment for the good in question. The most essential element in all this, however, is undoubtedly the psychic.

Turning now to supply, it appears at first blush that the physical or objective constitutes its more essential element. Well-established usage seems to sanction the statement that supply of a commodity consists at any time in the amount of it which is in the market. But does the acceptance of this statement really stamp supply as essentially an objective or physical phenomenon? A little consideration shows that it does not; for to accept this conclusion would evidently be to assume, contrary to the fact, that the state of being in the market is a purely objective or physical matter. Experience contradicts this assumption. A purely cursory observation of the market process shows that it is not the physical or objective shifting of goods that appears to cause price variation on account of changes in supply. It has been demonstrated on innumerable occasions that without the moving of a wheel the supply of a good in a given market may be multiplied, or, on the other hand, practically annihilated. Evidently, then, it is not the mere objective presence or absence of a good that determines whether or not it is to be reckoned as supply in any

market, but it is the disposition which those who control the good are willing and able to make of it. The essential fact is the willingness and ability of men to offer the good for sale.

Nor in the actual market can it be said that the physical or objective situation, ownership or even existence of the good, sets a positive and inflexible limit on the willingness and ability of men to offer it in the market in such a way as to constitute supply at any time. Whatever amount of a good prospective sellers in a market can convince purchasers that they are willing and able to deliver at an acceptable time, to be specified in the contract of sale, constitutes supply of that good, it matters not whether the good is at the time of offer actually within the market area, or even in existence, or, if in existence, by whom the present title of ownership is held. Nor is the supply limited by the actual offers which are considered to be *bona fide* by prospective purchasers. As in the case of demand, the amount of supply is a putative matter. Any means which is effective in causing prospective purchasers to impute to prospective sellers the present power and willingness to offer the goods in the market to an additional extent is also effective in increasing market supply.

Confidence, then, in the willingness and ability of prospective imputed sellers to enter into and to perform contracts, rather than any physical condition whatever, is evidently the limiting factor in supply. In strict analogy with demand, supply is in its essence preponderatingly psychological. It is, on the one hand, a desire or willingness, real or imputed, on the part of prospective purchasers to bring forward a good in the market, and, on the other hand, an ability, real or imputed, of the prospective sellers to make to prospective purchasers the necessary and satisfactory guarantee of delivery of the good in question. In short, the amount of supply is the amount of a good which prospective sellers are imputed to be willing and able to offer in a manner considered to be *bona fide* by prospective purchasers.

The forces which influence and determine both supply and demand for a good in any market, then, are to be found in the putative psychological attitude and proprietary condition of the

individuals who are supposed to be the prospective sellers and purchasers in the market, of the good in question.⁷

The fourth important general characteristic of market demand and supply refers to the time at which these phenomena in any specific case of price-fixing may be said to exist. It has become common for economic writers to refer to demand and supply as the amounts, respectively, of a good which are taken or offered in the market at a specified price. The inference frequently, and perhaps unconsciously, drawn from this statement is that the extent of demand and supply waits upon, or is determined subse-

⁷ The failure to understand the partly psychological character of supply, together with a failure to recognize the importance of the fact that goods in the market are wanted largely for future delivery, has lain at the foundation of a great part of the value controversy of recent years, which has consequently presented the edifying spectacle of a contest in which neither compromise nor the victory of either party could result in establishing the truth. The full effects of the time element on supply, as represented in contracts for future delivery and future payment, will be discussed later. This need not, however, prevent at this point explanation and proof which seems desirable of the statement just made.

The tap-root of the controversy between the Austrian and the classical economists seems to have been their diverse notions of the nature of supply. The Austrians seemed to tend persistently to regard supply as *stock in hand*. The classical economists, with equal persistence, tended always to identify it with *current technical production*. The "stock in hand" idea of supply seems to be that which caused the Austrians to neglect the analysis of the conditions of production, while the technical-production thesis appears to be the parent of the notion, so long a fundamental assumption of the classical school, that market supply is under the governance of the identical cost of production of the goods which at any moment are in process of making.

To reduce these general assumptions of identity to palpable absurdities, however, it is only necessary to enumerate the conditions which their universality would imply. In order that supply at all times should correspond exactly to stock in hand, it would be necessary to assume the non-existence in the market of all bargains for future delivery of goods, and also to deny the possibility of even temporarily withholding produced goods from the market. On the other hand, the assumption of identity at all times of market supply and current technical production would require these assumptions: (1) the impossibility of withholding technically produced goods from the market, and (2) the impossibility of the appearance of a good as supply more than once in any market, in which case the great and rapid fluctuations in supply which are characteristic of modern markets would have to be accounted for by the assumption of perfect flexibility of technical production both as to time and amount, i. e., the ability of the producer to increase or decrease his output at will and without delay. Manifestly the withholding and the remarketing of goods are acts always possible except in the case

quent to, the fixing of the price. The mere definite statement of this inference stamps it, of course, as erroneous. It involves the fatal error of looking at the demand and supply of an article as determined by the price at which it actually sells—an error fatal, because it directly contradicts the fundamental assumption of all price-reasoning, that it is the demand and supply which determine the market rate of exchange, thus involving us logically in a vicious circle. The only premise consistent with our fundamental assumption is that the demand and supply which stand in causal relation to price are phenomena which exist precedent to the act of purchase and sale. This premise must be unequivocally upheld

of very perishable commodities, and the possibility of perfect flexibility of production exists only in connection with immaterial goods—personal services—and in connection with these only in a limited and equivocal way. With the possible exception, then, of very perishable goods, and of those—if there be any such—into whose production the time element does not enter, and the amount of whose production is under perfect control, current market supply cannot be assumed to coincide with either stock in hand or current technical production.

It was probably recognition of the untenability of these assumptions in the grosser form that caused them to be presented in a more refined manner as assertions, on the one hand, that market supply is drawn wholly from stock in hand, and, on the other, that it is drawn wholly from current technical production. But in this more refined form they are no less erroneous. Were market demand determined wholly by those prospective purchasers willing and able to take goods for immediate delivery only—in other words, were all bargains for future delivery barred from the market—supply, at any time except in the doubtful cases where production might be assumed to be perfectly flexible, would necessarily be drawn wholly from stock in hand. But the market demand at any time does not come wholly from those who require immediate delivery of goods. In fact, especially in the case of relatively permanent goods—such, for example, as railway supplies and building material—current market bargains very largely take the form of contracts for future delivery. So far as this is the case, manifestly market supply at any time—i. e., that supply which helps to determine market price at any time—must and does transcend current stock in hand.

Equally obvious is it, however, that where bargains are made for immediate delivery—for example, in the case of the great majority of the bargains in connection with goods for immediate consumption—barring the assumption of perfect flexibility of production, supply cannot possibly be drawn from goods in process of production. In such cases supply is necessarily wholly drawn from stock in hand. Unless, therefore, we refuse to consider the market as it actually is, preferring an abstraction whose unreal simplicity bears little relation to the actual, we must admit that market supply is neither what it was conceived to be by the Austrian school or by the classical economists. The fact is that both schools erred in fixing their attention exclusively upon one simple phase of the complex phenomenon supply. Each saw a half-truth, from which each drew conclusions that were wholly false.

so long as we have discovered no conclusive evidence against the price potency of demand and supply. Fortunately, we are not dependent entirely upon indirect proof of the assumption that demand and supply which are causally related to price in any case exist prior to the specific act of purchase and sale concerned. Universal market experience corroborates this assumption. For the fact must be recognized by all that the act of purchase and sale, under ordinary circumstances, actually annihilates a certain more or less definite quantum of supply and demand through the attainment of the ends toward which men strive in market bidding. We seem justified, then, in assuming that demand and supply, which determine price in any particular sale, attain their final proportions previous to the specific market act concerned. How long previous to this act demand and supply are definitely determined cannot be discussed apart from a careful analysis of the market process under different typical circumstances, and must therefore be left for later discussion.

Acquiescence in the conclusion just reached involves a denial of the assumption, more or less current, that demand and supply can be represented in relation to a given commodity, each as a single definite quantity of the good. Evidently, so long as the price is not determined, prospective purchasers and sellers will not come into the market at any time prepared merely to take or bring forward a definite quantity of the good in question on the arbitrary assumption of a single definite price. On the contrary, both introspection and observation indicate that prospective dealers enter the market committed to no definite single act, but with more or less well-defined schedules in mind of amounts of the good in question which they are prepared to offer or take at various suppositional prices. Nor is it possible price variation alone which conditions the market activity. Aside from the matter of price, there are evidently a number of what may be termed essential market factors or terms, variation in any of which will affect the action to be taken by market bidders.

It should be clear, then, that demand and supply, considered as precedent to the market act, are phenomena which are necessarily *hypothetical* or *conditional*; and, as there must always be a plurality of hypothetical market terms or variants, neither demand

nor supply can be adequately expressed except as a series of hypothetical amounts correlated with a series of hypothetical conditions. It follows that a complete expression of either of these phenomena in any particular case would involve a correlation of amounts which prospective bidders are willing and able, or are imputed to be willing and able, to offer or take of the commodity in question, with all the essential, hypothetical, general conditions of a market bargain; that is to say, would involve as many items as there are possible combinations of all the essential, hypothetical, general, market-bargain conditions. In order, then, to carry forward our discussion of general demand and supply characteristics, it is necessary to inquire what are the general or typical essential market-bargain factors or conditions which determine immediately the action of prospective buyers and sellers, and, having discovered these, to determine their relation severally and generally to bidding in the market.

Proceeding thus, it is to be noted that not all the hypothetical variants which determine the action of bidders in the market can properly be considered as essential, general market-bargain conditions. We must distinguish carefully the general terms in which the offers in the market are made—that is, the conditions which determine the general character of prospective market bargains—from the causes which, on the supposition of a definite bargain character, determine the magnitude of these terms. To give a specific and simple example: In the case where a certain *price* is offered for a certain *quantity* of a good to be determined and paid for at a certain *time*, we must carefully distinguish the price, quantity, and time factors from the subjective and objective conditions represented by the personal *wants* and *habits* of the bidder, and the *quantity* of the good in the market. The former represent general market-bargain conditions, hypothetical correlations of which express demand and supply, while the latter are conditions which must be taken into account in attempting to explain the extent of demand and supply as thus actually expressed.

What, then, are the essential market-bargain conditions or terms, correlative variations of which express the demand and supply of any given commodity? In answering this question, we

have the advantage of the sure foundation of empiricism. Actual observation seems to show that the essential terms which are considered in the typical market bargain are: (1) the grade or quality of the commodity in question; (2) the amount or number of definitely specified units of the good; (3) the price to be paid; (4) the time of delivery and payment; (5) the kind or character of good in which payment is to be made; and (6) the degree of risk of non-payment or delivery involved.

A more careful examination of these six terms seems to throw doubt upon the validity of the inclusion or at least the independent inclusion of three of them. The grade or quality would seem to be too nearly the very essence of a good to be regarded as one of its variable attributes. It appears best, therefore, to define commodity or good as an individual in a class of economic articles, all of which are of the same quality; that is, to make every grade of article in connection with which market bidding takes place a distinct good or commodity. This rules out the first of the assumed market-bargain terms. Further, the kind or character of the good in which payment is to be made would seem to be a component element of price. Price is not merely a mathematical or numerical entity, but is in every case a numerical expression concerning a definite thing. We should assume, then, that the single expression "price" includes the terms numbered (3) and (5) above. The degree of risk also appears capable of being regarded either as something which is expressed through price, or as one of the causal elements quite outside the essential terms of the market bargain. At least, it may be said that the degree of risk does not enter into the specified terms of the bargain, and is always considered by bidders in determining prices at which they are willing to bid. These considerations seem of sufficient weight to cause it to be thrown out of the list of essential market-bargain terms.

There remain, then, three distinct market factors, the possible combinations of whose correlative variations fully express market demand and supply. It remains to give specific expression to these phenomena in terms of the three surviving factors. The difficulty of the task makes it expedient to attack it in the simplest manner possible. We shall, therefore, express demand and supply

first in terms of two of these factors, and then add to these expressions whatever complexity results from the inclusion of the third and final term.

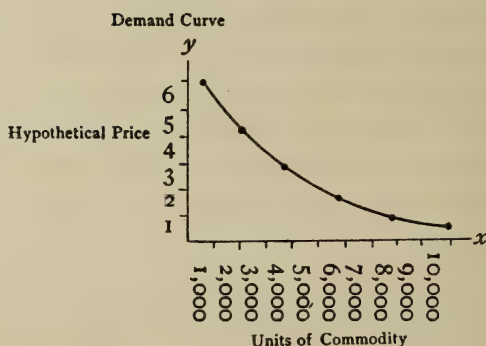
Fifthly, then, we may say that, other things remaining the same—the time element being disregarded—the extent of the demand or supply of any good is the resultant of a correlation of various quantities of it with various hypothetical prices. We have already said that observation and introspection furnish ample proof of this statement. It is true that there are circumstances under which individuals enter the market apparently definitely committed to the purchase or sale of a fixed quantity of a commodity at a fixed price. But it is probable that even in such cases the majority of individuals are prepared, more or less consciously, to vary the quantity and price, if circumstances make it necessary to do so, in order that they may effect a trade. For example, the purchaser, though he may have entered the market practically committed to the acquisition of a certain definite amount of the good in question at a definite price, will often purchase a less amount of the good, if he finds that his price estimate is too low, rather than retire from the market altogether without the good in question; and he will frequently increase the quantity which he is willing to take as soon as he finds that it can be obtained at a less price per unit than he had anticipated. And the opposite is true for the seller of the good. The conventional two for ten cents and three for a quarter illustrates the principle. But, under many circumstances, the keen trader does wait until he has entered the market to correlate amounts and prices of the good in which he expects to deal. He has in mind, before his appearance as bidder, a definite schedule of varying amounts of the good in question which he is willing and able, or which he proposes to convince others that he is willing and able, to purchase or sell at varying prices. Whether or not, however, these schedules are perfectly definite, and whether or not they are worked out before the entry of the individual into the market, does not affect essentially the general character of demand and supply. The essential fact is that in any case more or less definite hypothetical commodity-price schedules exist in the minds of individuals previous to the act of purchase and sale.

We may therefore assume that, leaving aside variation in the time element, the total demand or supply of a commodity in any market may be represented by one combined schedule of correlated amounts and prices. In short, abstracting from the time element the demand for a commodity is to be represented by a schedule of the varying amounts of the good which prospective purchasers are willing and able, or are imputed to be willing and able, to take at varying hypothetical prices, and the supply by a schedule of the varying amounts which prospective sellers are willing and able, or are imputed to be willing and able, to offer at varying, though not necessarily corresponding, hypothetical prices.

In illustration of these statements we may construct the following demand-and-supply schedules and curves for commodity x , noting that these schedules and curves, while in general representative of all commodities, are constructed without reference to the time element, and therefore must not be taken as the complete and final representation of demand and supply.⁸

DEMAND SCHEDULE

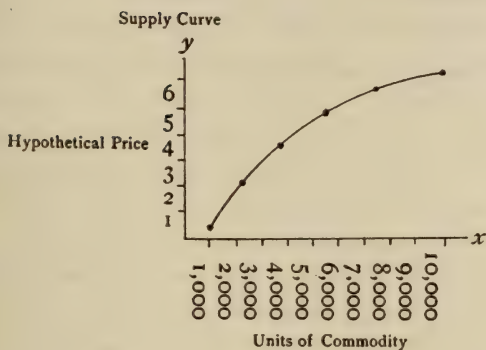
Hypothetical Price	Units of Commodity Hypothetically to be Taken
1 y	10,000 x
2 y	7,000 x
3 y	5,000 x
4 y	3,500 x
5 y	2,500 x
6 y	2,000 x



⁸ It is, of course, to be understood that these schedules represent only portions or segments of possible demand and supply considered with reference to quantity and price.

SUPPLY SCHEDULE

Hypothetical Price ^o	Units of Commodity Hypothetically to be Disposed of
1 <i>y</i>	2,000 <i>x</i>
2 <i>y</i>	2,500 <i>x</i>
3 <i>y</i>	3,500 <i>x</i>
4 <i>y</i>	5,000 <i>x</i>
5 <i>y</i>	7,000 <i>x</i>
6 <i>y</i>	10,000 <i>x</i>



It remains now to attempt an expression of the market demand and supply of a commodity in terms of the three distinct market-bargain factors—quantity, price, and time. This attempt will constitute the second part of our discussion concerning the general characteristics of these phenomena.

II

Hitherto we have been engaged in the task of sifting from the rather heterogeneous mass of current thought, in regard to demand and supply, characteristics which admit of being arranged in a consistent series. We have now the far more difficult task of discussing the effect upon these phenomena of a most significant modern economic development—the transition from money to credit economy.

The current conceptions of demand and supply which have been dominant in economic thought take little or no account of this development. They rest on a naïve assumption of impossible

^o It is to be understood, of course, that these figures and illustrations are merely arbitrary; there is no necessary reciprocal relation between the extent of demand and supply as here represented.

market simplicity. They assume a market in which buyers and sellers are engaged exclusively in the exchange of consumption goods for their own immediate uses, in which, in other words, there are no exchanges of intermediate goods, or relatively permanent productive agents, no credit sales, and no bargains for future delivery. In short, they assume a market in which the time element is lacking. It is our purpose now to rise above this naïve conception of the market and to consider, sixthly, the effect upon the general character of demand and supply of the fact that bargains for purchase and sale are concluded with reference not only to the quantity and price of commodities, but also to the time of delivery and payment. In doing this we shall have by no means fully discussed the demand and supply effects of the time element. We shall have considered time merely in its relation to the general concepts "demand" and "supply." Realizing the strangeness of the country through which we are to travel and the danger of going astray without the aid of familiar guideposts, our attitude in this discussion will be that of an explorer who maps out the region as he sees it, but, realizing the limited range of his vision, waits eagerly the accounts of other travelers.¹

If we are to understand the demand and supply potency of the bargain-time element, we must determine the effect of variations in the time of payment and delivery upon the willingness and ability of prospective dealers to offer and to take goods in the market. This involves first a discussion of the relation between valuation and the lapse of time.

Intelligent observation of empirical data seems to show that the postponement of the possession of a good detracts from the present worth of its acquisition. For example, the present worth of a dinner to a hungry man just drawing up to it is greater than the present worth of the command by the same man over the same dinner postponed till the next day. A tired worker just starting on his annual vacation places a higher estimate on its

¹The writer wishes to acknowledge his indebtedness to Professor Frank A. Fetter for directing his attention to the pervasiveness of the time element in modern economy, for fundamental notions in regard to the relationship between valuation and the lapse of time. He is also indebted, for important suggestions which have been worked out in the discussion, to Professor Herbert Joseph Davenport.

worth to him than he does upon the power to command the vacation of the following year. The economic explanation usually offered for this generalization is in the main this: that deferred gratifications² are lessened in prospect. But whatever the psychological or psycho-physical basis of this fact may be, for the economist the proof of its generality must finally rest on simple experience. It is always open, therefore, to challenge from this standpoint; but, clearly defined, it appears to stand the empirical test. In order to show this we shall have to inspect it somewhat more closely.

It is not claimed, then, by those who intelligently adhere to this generalization, that the gratifications derived from an object postponed are actually lessened, or, to put the matter more objectively, that the worth to us of postponed goods is necessarily actually lessened. The enhancement to us of the worth of goods that we have previously stored up is among the commonest economic experiences. Evidently, then, the proposition must not be taken to mean more than that the postponement of the use of a good makes it of less worth to the individual *at the time of the postponement* than it would be if immediately used to gratify his needs. That is to say, the estimates compared, if this proposition is to be valid, must be of present as against future worth made by the individual at a single moment of time.

But will the proposition thus interpreted hold? Evidently it will not. The very fact that rational men do postpone the consumption or use of goods in their possession or under their control negatives the proposition as thus stated. The hungry man possessed of a dollar does not contemplate eating two fifty-cent dinners today, and partly at least because he realizes that a greater sum of gratifications is to be had, or that to a greater extent his purposes are to be subserved, by distributing the dinners over both today and tomorrow. So also the tired worker who can command at will a month of vacation within two years very likely chooses to postpone half of it because of his belief that he will thus get the

² "Gratification," whenever it is used in this thesis, must not be interpreted as identical with pleasure or happiness in the crude hedonistic sense. It is here used to mean simply that complex of considerations which, together with its negative, determines choice.

maximum of gratification or better subserve his purposes. The hungry man knows that he will be hungry again tomorrow, and if he believes that his hunger then will be keener than today at the end of the first dinner, he may fix the future at a higher point than he will the present worth of it. The worker will be influenced by similar considerations, and in addition his action may be influenced by differences in the vacation possibilities of this and next year. If circumstances are such that this year he will be forced to spend his vacation in the city, while next year he believes that he will be able to take it at the seaside or in the mountains, where he feels perhaps that he may derive greater benefit, it is very probable that even at the present time the future vacation may seem the more desirable of the two, and he may even decide to forego any relaxation this year in order to spend the two weeks at present under his control in a more desirable manner in the future. Evidently, then, we must still further restrict the main proposition by stipulating that the comparison must not only be of the present as against the future worth of the good made at the time of postponement, but also that the individual making the comparison must assume that the relation of his need to the good will be essentially identical at the two points of time, and that the good itself will have essentially the same want-gratifying power in the future as at the present. Only if all these allowances are made can we say with certainty that the good postponed will appear to be of less worth than the good present.

It may appear now to the reader that we have emasculated our proposition. This, however, is not true. We have merely guarded it against misstatement. The proposition was not that a postponed good is lessened in value, but that the *postponement* of the possession or use of a good detracts from the present worth of its acquisition to the individual concerned. That is, that postponement *per se* detracts from estimated worth of acquisition. The actual present worth of the postponed good to the individual is an algebraic sum in which a discount for time always figures as a negative term. The actual result may be an amount which is more or less than the worth of the good for present uses, according to the specific variation in the other elements which we have

considered. Postponement itself, however, is always an element lessening the present worth of acquisition of the postponed good; and it seems clear, moreover, that this lessening of worth is in direct ratio³ to the extent of postponement, so that ultimately, if the postponement is long enough, the actual present worth of the postponed good, regardless of the accessory circumstances, must be diminished, falling in the extreme case to zero.

Our first assumption, then, in regard to the effect of postponement upon valuation appears to be sound when tested by the facts of everyday life. However, it is to be observed that we have thus far considered only one of two equally important specific aspects of the question. Market bargaining involves not only prospective acquisition, but also prospective relinquishment of goods. Bidders contemplate not only the gratifications to be acquired in the acquisition of goods with their uses, but also the gratifications to be sacrificed in the relinquishment of goods with their uses. The willingness and ability of A to take corn, for example, means his willingness and ability to offer money or some other good. Just as, then, we have considered the effect of postponement of possession or acquisition upon estimates of worth, so we must consider the effect of postponement—of relinquishment—i. e., of non-possession; for the bargain-time element concerns the time both of delivery and of payment.

At bottom the latter problem seems to be the reciprocal of the one just considered. Relinquishment is the reciprocal of acquisition, sacrifice of gratification, the postponement of delivery the reciprocal of the postponement of payment for the same good. Accordingly, we should expect to find the effect upon worth of postponed relinquishment to be the reciprocal of the effect of postponement of possession. And this, in fact, seems to be the case. That is to say, the postponement of the payment for a good detracts from the present negative worth of relinquishment. Or, to put the matter in positive terms, the postponement of payment detracts from the present estimate of the worth to be relinquished.

³ This statement is not intended to be taken as indicating that the lessening of worth is in exact ratio to the increasing of the time of postponement. It is merely intended to indicate that as the time of postponement increases the lessening of worth increases.

The psychological explanation of this fact is usually considered to be that postponed sacrifices are lessened in prospect. But, whatever its psychological basis, the main proposition seems amply proved by introspection and observation.

However, this proposition must, like that concerning the effect of postponed acquisition, be strictly construed. It does not mean necessarily that the sacrifices undergone in the relinquishment of an object are necessarily lessened by postponement of the relinquishment, nor that the present estimate of the worth to be relinquished is always lessened by postponement of relinquishment. It means simply that, when the individual making the comparison assumes that the relation of his need to the good is to be the same in the future as at present, and that the good itself is to be essentially the same, postponement of relinquishment will then lessen the estimate of the present worth to be relinquished. In other words, postponement of relinquishment *per se* detracts from the estimated present worth to be relinquished, or sacrificed. This being admitted, observation and introspection seem to show also that the lessening of the sacrifice of relinquishment as estimated in the present is, other things being equal, in direct ratio⁴ to the length of time that relinquishment is postponed.

The relation between valuation and the lapse of time seems then in its main aspects to be clear and simple. Postponement lessens the present importance both of deferred gratifications and of deferred sacrifices. Clear as may be the reasoning upon which this conclusion is founded, however, it must not be accepted if it can be shown to do violence to any of the undoubted facts of the market. Before attempting, then, to use it in generalization, in connection with the characteristics of demand and supply, it will be well to consider quite carefully possible contradictions to its validity in actual market experience.

It seems reasonably clear, then, that if all the bidders in the market were men for whom the good bid upon and the good used in making payment had a direct personal and present use in consumption, postponement would always discount the present worth of gratifications and sacrifices, and that the conclusion which we

⁴ See p. 29, n. 3.

have drawn would, of necessity, be universal in its application. But is it true that all the bidders in the market have a direct and immediate use in consumption for their goods? Evidently it is not. Barring money from consideration, in order to free the subject from unnecessary complication, by assuming that it is a good which may always be considered as desired for personal and immediate use, there are two cases at least where the interest in the goods taken by prospective purchasers and sellers is not of this nature. There are cases, first, where the bidder has personal use for the good in question, but the usefulness of it to him lies exclusively either in the present or in the future. A contractor, for example, who is to construct a building the coming season, has no use in consumption for materials at present, but he is likely to be in the market now bidding for the goods to be delivered in the future at the time of his need. Secondly, there are cases where the sole interest of the bidder in the good in question is speculative in its nature; that is to say, where the bidder expects simply to pass the good acquired along at a profit, having no consumptive use for it, either present or future. The situation is so familiar that it needs no illustration. Both cases apparently involve exceptions to the bargain-time discount rules which we have formulated. The question for us then, is: Are these exceptions real or merely apparent? Let us examine each case separately.

Considering buyer and seller, and both good in question and means of payment, there are eight possible variations of the first case. They are, however, merely permutations of which the example already cited is typical. We shall be warranted, therefore, in confining our attention to this example. Can we say, then, truthfully that where the prospective purchaser—e. g., the contractor—has little or no present use for the commodity in question, the postponement of its delivery to a time when he has a positive or relatively great use for it detracts from its present worth? Such a statement is, on the face of it, obviously absurd. But does this concession invalidate the principle of time discount? Reference to what has already been said justifies a negative answer. As we have seen, only where the relation between the

good and the needs of the individual concerned are assumed to be identical does the postponement of delivery necessarily result in a positive detraction from the present worth of the good. In so far, then, as the contractor may have present need for the commodity identical with his future need, we are still justified in assuming that postponement of delivery *per se* lessens the present worth of acquisition, and will affect negatively the amount of the good which he will be willing and able to take at a certain hypothetical price per unit.

But does this argument really dispose of the present case? Here we have a typical market situation, where on assumption there is no possible identity between present and future needs dependent on the good, because the prospective purchaser has *no* present use for the good. Although, then, the principle of time discount remains valid where it applies, does not this case indicate that there are market situations which include the element of postponement where the principle of discount is not involved; in other words, have we not shown that the principle of time discount, while operative in certain market cases, is not of universal market application? Apparently this is true; but it will not do to give an offhand answer to a question of such great importance. We must examine it with all due care.

Really we have here two distinct questions: (1) Is the time element as a factor determining demand or supply at all involved in a case of this kind; and (2) if so, does postponement here operate as a discount factor? Let us consider these questions in detail.

First, then, in the case supposed above, where it is assumed that the prospective purchaser has no present use for the good, is the time element at all involved—does postponement in any way affect the present worth of the good? The argument against any such effect seems offhand, simple, and cogent: If there is no present use for the good, there is no present need for it; how then can its immediate possession have any present worth, and how then can any comparison be instituted between the worth of present and future delivery? But if no temporal comparison can be

instituted, it surely cannot be said that time enters as a factor into the problem.

This line of argument might perhaps be successfully combated by the subtle assumption that no case really can exist where goods are purchased for future delivery in the absence of a present need. And it seems not unreasonable to say, in support of this view, that where the individual, as in this case, has no present use in consumption for the good in question, the insurance of the satisfaction of his future need for it creates of necessity a very positive present need—the need of present control through purchase. Holders of this view would assert that the actual presence in the market, at the moment, of prospective purchasers for future delivery would be inexplicable on any other assumption.

But the possibility and actuality of temporal present-worth comparisons where goods are sought to be purchased for future delivery can be shown by a slightly different, and perhaps less subtle, line of reasoning. The essential purpose of the prospective purchaser in such a case is to secure a coincidence with the needs of a certain time in the future of the means for their gratification. This coincidence has a present worth to him, the simple proof of which is the insertion in such bargains of a forfeit to be paid in case of non-delivery at the time specified. The existence of this present worth being granted, it follows that it varies with the possibility of contract failure. Possibility of delay of means beyond the point of time when the needs are anticipated obviously would lessen the present worth of their future possession, and it is easily conceivable that the same effect might result from premature delivery of the goods in question. There seems no doubt, then, that the time element does operate as a factor determining demand and supply in the class of cases typified by the purchase for future delivery in the absence of present consumptive needs.

This brings us to the second question in connection with such cases: Does postponement invariably operate as a discount factor. The example just cited seems to require a negative answer, and thus to nullify the universality at least of the general assumption that postponement always detracts from the present estimate of gratifications to be acquired or sacrificed, and affects therefore

in an invariable manner demand and supply. Are we driven at last, then, to abandon or modify this principle? No. Sound reason reveals it still triumphant. Where the need which prompts to purchase is wholly assigned to the future and therefore conditions are such as to cause a bargain for a future delivery, we may still say with truth that the present worth of the gratifications to the purchaser which the good represents is less than it would have been had the want in question been felt in the present instead of in the future, and had the conditions therefore existed which would have caused a bargain for present delivery.

In this case it is the need itself that has undergone discount, for time and discount of the need obviously involve, in this case, discount of the gratifications associated with the object which stands in causal relation to the satisfaction of that need. In this case, therefore, we may still say with truth that the amount of the good which the prospective purchaser is willing and able to take at a specified price is less than it would have been if conditions had been such that the bargain might have called for present delivery. In short, there is nothing in this type of cases which invalidates our general principle that postponement detracts from the present estimate of gratification and sacrifice.

Before, however, we can accept this principle and the conclusions to be drawn from it without reserve, we must examine the second apparent source of exception to its validity. There are cases, then, in the market where the sole interest of the bidder in the good in question is speculative in its nature; that is to say, where the bidder expects and desires simply to pass the good on again at a profit. Apart from retail dealing, this seems to be almost the typical market attitude. Under such circumstances can it be said that future delivery detracts from the present worth of the good? To get a concrete instance to work upon, take the case of a dealer in wheat on the produce exchange, who, having no interest in wheat except as a trader, determines in March to buy for May delivery. Can we say that the postponement of delivery in this case acts as a discount on the worth of the acquisition to the prospective purchaser? At first blush an affirmative answer seems absurd, but let us analyze the situation carefully.

The need which the prospective purchaser has for wheat is represented by his desire to turn over his capital at a profit. The strength of this need is in proportion to the percentage of profit that can be made on the operation. The motive of the prospective purchaser in desiring to contract for future delivery is based on his belief that the selling price at that time will exceed the purchase price to a greater extent than it does at the present moment. But, as his need is measured by his profit, this is to say that his need for wheat in May is estimated by him to be greater than his need for it at the present moment. And it is this difference in the relation between his wants and the good at the two different points of time that causes him to prefer the future delivery. If the principle at stake has been clearly comprehended, this analysis of the situation shows at once that the present case forms no exception of its operation. If the estimated money profit to be obtained by delivery in May were no greater than the profit resulting from delivery in March, it is obvious that March delivery would be preferred. But this is merely saying that, in so far as the estimated needs dependent on the good in question are identical at the two periods of time, the postponement of delivery detracts from the present worth of the good.

In the absence of contradictory evidence, then, we seem justified in accepting, provisionally at least, and properly interpreted, the principles that the postponement of the possession of a good detracts from the present worth of its acquisition, and that the postponement of the non-possession or giving-up of a good detracts from the present estimate of the sacrifice involved in its relinquishment. In the absence of contradictory evidence, also, we seem justified in assuming that these principles underlie and affect the estimates of market bidders in all cases connected with the prospective purchase or sale of goods where postponement of delivery or payment, or both, are contemplated. If this much be granted, the following conclusions in regard to the general relation between the time element on the one hand, and individual demand and supply motives on the other, must also be provisionally accepted: (*a*) In the case of the prospective purchaser, first, postponement of delivery must tend to lessen the willingness to

take a good from the market, because it lessens the present worth of the good to be acquired, and we can safely assume that a man's willingness to purchase goods, other things being equal, will depend on his estimate of their present worth to him; secondly, postponement of payment must tend to increase the willingness and ability to take a good from the market because it lessens the present worth to be sacrificed, and a man's willingness and ability to purchase, other things being equal, obviously depend on the extent of the sacrifice made at the time of the bargain. (b) In the case of the prospective seller, first, postponement of delivery must tend to increase the willingness to bring forward a good in the market, because it lessens the present worth to be sacrificed; secondly, postponement of payment must tend to lessen the willingness and ability to bring forward a good in the market, because it lessens the present worth of the payment to be received. (c) It follows that at any given hypothetical price series, other things remaining the same, first, postponement of delivery must tend to decrease the demand of individual bidders in the market for any given good, and to increase the supply of the good which individual bidders will bring forward to the market; secondly, postponement of payment must tend to increase the demand of individual bidders in the market for any good, and to decrease the supply of the good which individual bidders will bring forward to the market. (d) Finally, on our original assumption that total market demand and supply of any good represent the summation of the demand and supply of individuals, we reach the conclusion from the above that, first, all other things remaining the same, postponement of delivery must tend to decrease the total market demand, and to increase the total market supply of any given good; secondly, postponement of payment must tend to increase the total market demand, and to decrease the total market supply of any given good.⁵

Thus we finally and definitely seem to have established as a sixth general characteristic that the demand and supply of a commodity are to be expressed as correlations of the three fac-

⁵ In all this the reader is begged to bear in mind that the term "market" is used in the abstract generic, and not in the specific, sense.

tors—quantity, price, and time. It remains in this connection to exhibit concretely the general character of these phenomena as resultants of this threefold correlation.

We have seen that, abstracting from the time element, demand and supply may each be expressed as a single schedule of correlated quantities and hypothetical prices; the demand schedule representing the varying amounts of the good in question, which prospective purchasers are willing and able, or are imputed to be willing and able, to take at all possible hypothetical prices; the supply schedule, the varying amounts which prospective sellers are willing and able, or are imputed to be willing and able to bring forward at corresponding hypothetical prices. If we accept these schedules as adequate concrete expressions of demand and supply, when the time element is disregarded, it becomes obvious that they are also perfectly valid expressions of demand and supply when the time element is taken into consideration, provided that this element is assumed to be invariable. That is to say, if in the market, bargains invariably specified exactly the same conditions in regard both to delivery and to payment, the calculations of prospective purchasers and sellers would always be made on the assumption of an invariable temporal agreement, and the single schedules which we have used would still be adequate expressions of demand and supply considered as correlations of the three elements. Let us then assume, as we may without error, that these schedules adequately represent demand and supply in the case of the simplest bargain type—where, that is to say, the market agreement calls for cash down and immediate delivery. Our present task will then be to show how this schedule must, if at all, be modified, or what, if any, additional schedules must be constructed in order to give a complete expression of demand and supply under all possible temporal bargain conditions.

In general, there seem to be three solutions of this problem which are worthy of consideration. Each of these is based on a distinct notion in regard to the essential nature of time as a market factor. In the first solution time is assumed to be an independent good bought and sold in the market; in the second,

time, in its double market aspect, is regarded as an essential element, on the one hand of price, and on the other of the good in question; in the third solution both these assumptions are denied, and time is looked upon, as hitherto in this thesis, as a distinct market-bargain factor co-ordinate with price and quantity of good. We shall consider these solutions in order.

According, then, to the first view expressed above, a given concrete market bargain, where the time element is present, is not the resultant of a simple co-ordination or correlation of the three elements—quantity, price, and time. It is rather the final resultant or compound of two independent correlations—a correlation of price and quantity, and another correlation of price and time. In other words, every concrete market bargain represents logically the resultant of two acts of purchase and sale. That is to say, first, the good in question is itself purchased or sold for a given price regardless of any temporal consideration, and, secondly, the privilege of postponing delivery or payment, or both, is bargained for at a certain price. The price finally actually paid, then, is to be looked upon as the sum paid for two goods—for a certain quantity of commodity and for a certain temporal privilege.

To make the matter perfectly clear, take a concrete case. A sells a ton of coal to B to be delivered at once and paid for one month from date. This matter, which appears superficially as a single bargain, really involves two independent transactions, according to the view under examination: first, the purchase by B of a ton of coal at a certain price, and, secondly, the purchase by B at another price of the privilege of postponing payment for one month. Or, looking at the matter from the opposite standpoint, we may say that A sells, first, a ton of coal at a certain price and, secondly, the privilege of postponement of payment at a certain price. The illustrations might, of course, be greatly varied according to the temporal bargain conditions assumed and the particular standpoint taken, but this will be sufficient perhaps to indicate the essential significance of the double-bargain proposition.

In this view, then, there is in the market at any time a single

prevailing price for any given commodity, and time is simply one of the commodities bought and sold, having therefore its own single prevailing rate or price. It follows that, in all bargains for commodity x where postponement of payment or delivery is agreed upon, while the superficial observer, assuming that the commodity alone is purchased and sold, sees evidence of a variation in the price of the commodity x , the enlightened observer knows that the real price paid for x is the same regardless of the temporal agreements, and sees in the apparent variation of price a purchase of time—the price paid for time acting as an equalizer in all concrete sales. The view here expressed, it is pointed out, receives confirmation in the everyday language of the market when we speak of selling a good at a certain price, so much off for cash, or so much additional for credit.

This analysis and illustration of the concrete nature of a market sale indicate clearly how, according to the first solution named above, the time element finds concrete expression in demand and supply. Whenever in the concrete case the prospective purchaser or seller of a commodity (not time) contemplates the possibility of purchasing or selling for future delivery or payment, he enters the market with at least two distinct schedules in mind—one representing demand or supply, as the case may be, of the commodity (not time), the other representing demand or supply of time.

For example, A, let us suppose, is a prospective purchaser of some commodity, x . If he is altogether unwilling to accept postponed delivery and is committed irrevocably to cash payment, the time element will not enter into his considerations, and his demand for x may be adequately represented by the single schedule given on page 47. In so far as all prospective purchasers in the market are in the same mood as A, this schedule may be made adequately to represent the general demand for x in a given market. If A, however, desires credit, or will consent to postponement of delivery, he will naturally enter the market with more or less well-defined notions of what he is willing and able to do in case credit may be obtained or immediate delivery is to be foregone. That is to say, he will take into consideration the

time element. In such cases, according to the double-bargain theory, it is evident that, in addition to the schedule of the amounts of the good x that he is willing and able to take at all varying hypothetical prices, he will have in mind also a time-price schedule. This additional schedule will represent time discounts. It will consist, in case he contemplates postponement of delivery, of the varying lengths of time of postponement which he is willing and able to allow at various hypothetical discount rates or time prices. If he contemplates postponement of payment, his time schedule will consist of the varying amounts which he is willing to pay for varying degrees of credit extension. But these time schedules, according to this view, represent in the first case supply and in the second case demand for a quite distinct commodity. They exist and are specifically determined quite independently of the commodity x , whose price under all temporal conditions is invariable, and whose demand is still the simple, original schedule given. Similar illustrations might be given for supply, which is held to be in all essential respects analogous to demand.

To sum up, then, according to the view just considered: The real price paid for any commodity (not time) is always its cash-immediate delivery price; the real demand and supply of any commodity (except time) are the varying amounts of it which prospective purchasers and sellers are willing and able, or are imputed to be willing and able respectively, to take and bring forward at all possible hypothetical prices; time is an independent commodity or good; the price of time is the prevailing discount rate; the demand and supply of time are respectively the varying amounts of credit extension for which bidders are, or are imputed to be, willing and able to pay varying hypothetical prices, and the varying amounts of postponement of delivery which bidders are, or are imputed to be, willing and able, to allow at varying hypothetical prices; any ordinary concrete bargain in which time enters as postponement of delivery or of payment, or of both, involves two distinct price payments and two distinct demand and supply calculations; that is to say, in such a market-bargain the three elements—quantity, price, and time—are finally correlated

through the summation of the results of two simple correlations of two terms each.

This view of the nature and effect of the market time element apparently makes the objective demand-and-supply problem a very simple one. We must now inquire whether there are any serious objections to its acceptance.

In the first place, is there not an element of unreality in this subtle analysis of the market situation? Does not this view place a strained interpretation upon the actual attitude of men who enter the market contemplating credit and future delivery bargains? These are questions, of course, on which the mere observer can secure only inferential evidence. The positive data are entirely subjective, and no man can, apart from elaborate inductive study, give positive answers except for himself. There is room here, therefore, for honest difference of opinion.

It is the opinion of the writer that the typical bidder who enters the market to purchase or sell a given commodity is not consciously contemplating bidding for two distinct goods. He is certainly conscious of the existence and significance to him of the time element in connection with the commodity which he intends to buy or sell; but does he not always think of the time element as most intimately associated with the good—as a quality which modifies for him the usefulness of the commodity in question? That is to say, does not the time element appear to him always as somewhat in the nature of a coefficient of some other good, and while, as in the loan market the coefficient appears to outrank the importance of the good itself, are not these two things always thought of as standing to each other, not in arithmetic, but in algebraic relation? It appears to the writer that this is the case, and that this attitude is but the natural reflection of the essential nature of the objective situation. The fact is that, if it should prove to be true that time is an economic good, it would certainly not be a substantive, but always an adjective good. That is to say, time is never an independent market commodity and has significance in the market only as attached to some substantive commodity or commodities. Mere time, in other words, is not bought and sold. It has no demand-and-supply schedule, and no price

apart from some other good. If this be true, however, we seem forced to abandon the double-market-bargain theory in favor of one or the other of the alternative views earlier suggested.⁶

The argument against the double-bargain theory leads up to the second hypothetical solution, mentioned on page 32, which is based on the assumption that time in its market relationship is an essential element, on the one hand of price, and on the other of the good which prospective purchasers and sellers are contemplating. According to this view, whenever a good is bought and sold in the market, and the time element is present, this element does not appear either as a distinct good which is separately bargained for, or as a distinct and independent bargain element, but is assimilated, in the case of postponement of delivery, with the good, and in case of a postponement of payment, with the price. In other words, every variation in the market-bargain time element in connection with the purchase and sale of a given physical or objective commodity creates a new good or a new price. In short, from this standpoint a single kind of physical commodity in the market, uniform in quality—as for example, No. 1 May wheat—really consists of as many different and distinct kinds of economic goods as there are variations in the time of delivery contemplated by prospective or actual purchasers and sellers; and, on the other hand, a given amount of money which is to be paid for a unit of the physical commodity, say a bushel of wheat, really constitutes as many different prices as there are different degrees of postponement of payment contemplated by prospective or actual purchasers and sellers. Whenever, therefore, a variation occurs in the market time element—for example, when the time element is introduced as credit—it does not mean that an amount of a good is offered or taken at the same price as before, but that a new price for this article exists. Also, when the time element enters as a postponement of delivery, we have a new good, and thus evidently a new and distinct price problem.

⁶ The really decisive consideration against what we have called the double-market-bargain theory of demand and supply lies outside the possible scope of this paper. It will appear in the sequel, however, that when the time element enters into the bargain for a commodity, the true basis upon which is reckoned the utility of the commodity *per se* as supply is essentially different from what it is when the bargain contemplates immediate cash payment and immediate delivery. To the initiated this fact is conclusive evidence.

To make this matter perfectly clear, take again a specific example. A wishes to buy a ton of coal from X, for which he is willing to pay \$5 cash for immediate delivery; B also wishes to buy this ton of coal, and is willing to pay \$5 cash for delivery three months later; C also wishes the coal, but demands immediate delivery, and is willing to pay \$5 one month from date of sale and delivery. Now, according to the view which we are contemplating, under these circumstances this ton of coal is not one but two distinct economic goods. If A or C succeed in trading, they get a different good from that obtained by B if he secures the coal. On the other hand, if A or B trade, they pay a price for the coal which is different from that which C pays if he succeeds in making a bargain for it.

If this view be accepted, the problem of the effect of the time element on demand and supply—the final correlation of the three market elements—is solved by merging the third element (time) with either or both of the other two; in short, by denying its independent existence. The number of distinct goods and of possible prices in the market is enormously increased, but the demand and supply of each good is adequately represented by the simple quantity-price demand and supply schedules and curves which we have already constructed. The only changes which we should be obliged to make in our demand and supply illustrations would be that, on the one hand, instead of constructing a single demand and a single supply schedule or curve for commodity x , we should be obliged to construct separate schedules and curves for commodity x delivered immediately, for commodity x delivered three months from date, or at any other time; and, on the other hand, instead of allowing \$5 to represent one price in the construction of each of these schedules and curves, we should be obliged to allow \$5 to represent a descending series of prices, beginning with \$5 cash and running down to the greatest possible hypothetical credit extension in the market. In concluding this exposition, it should be noted that, though, according to this view, the demand and supply of a single economic good are adequately represented by schedules and curves as simple as these which appear on pages 47 and 48 still the demand

and supply of any given physical commodity in the market where the time element appeared in the form of variable degrees of postponement of delivery could be completely expressed only by a series of irreducible schedules and curves analogous to those just mentioned.

What, now, is to be said as to the validity of this disposal of the time element as a demand-and-supply factor? As in the case of the double-market-bargain theory, it does not seem wise here to dogmatize. Here also there seem to be reasonable grounds for honest difference of opinion. However, again it appears to the writer that the best solution of the problem has not been found. If we were at liberty to construct a new economic terminology, there might perhaps be no fundamental objection to defining price as a definite amount of a price-good paid at a definite time. In the terminology which we have, however, price seems to have no such general connotation, but is understood to be a definite quantity of a given commodity simply. On the other hand, it must be admitted that we have the beginnings of such a terminology in such expressions as "price, \$5 net." Still, as things stand, price seems to be an objective thing. It is an amount of a commodity paid; it is a dollar, a bushel, a day's service, a sonata. It has its varying subjective worth, like all other objective things. But it would seem to be straining the point to say that it is a different price when this worth varies. If this view were taken, a good which sold invariably for \$5 cash would have as many different prices, for aught anyone could tell, as there might be different individual purchasers of it. If variation in the time element is, however, assumed to alter price, it is simply because of the variation in the subjective worth of the given amount of objective commodity paid at the different times. But if we cannot say that \$5 is a different price when paid by A than when paid by B, because of difference in subjective worth, how can we say that it is a different price when paid by A at two different periods, because it represents at the different periods different subjective worths to him? If we are to avoid unnecessary readjustments of terminology, it would seem necessary to reject

the idea that the market time element as represented by postponement of payment may be assimilated with price.

Turning to the other side of the question, the objections to the view under discussion seem to be at least as potent. According to this view, it will be remembered, every variation in the time of delivery of a given physical commodity makes of it a new economic good. If we view this matter from the standpoint of two individuals, the proposition at once appears untenable. Surely x , other things remaining the same, is one and the same good though A, desiring it, demands immediate delivery, while B is willing to accept it a month from the date of the bargain. The exigencies of theory do not seem to warrant us in wrenching ourselves loose from the common-sense point of view with such violence as the denial of this proposition would require. Moreover, if we look at the question from the standpoint of a single individual, the outcome seems equally unfavorable to this view-point. The reason for asserting that a change in the time of delivery creates a new economic good is evidently that the objective or physical commodity plus postponement does not mean the same to an individual measured in gratifications as does the good without postponement of possession. But this is merely saying that the psychic income derived from the commodity, under the different temporal conditions, varies. However, variation in the psychic income from a good seems hardly sufficient ground for denial of its identity.

In short, it seems altogether reasonable to say that an economic good as it appears in the market is an objective thing. It may stand in different relations to my wants, and possess different degrees of utility for me at different times, but it is still the same good. Its time relation to me is analagous to its quantity relation. The good is not changed in character when its quantity is increased; why, then, is it changed in character when a time relation is changed which involves no greater alteration in its utility to me than the change in quantity? On the whole, then, it seems best to reject the second solution offered in explanation of the demand-and-supply potency of the market-time element.

Having no other present alternative, then, we are obliged to

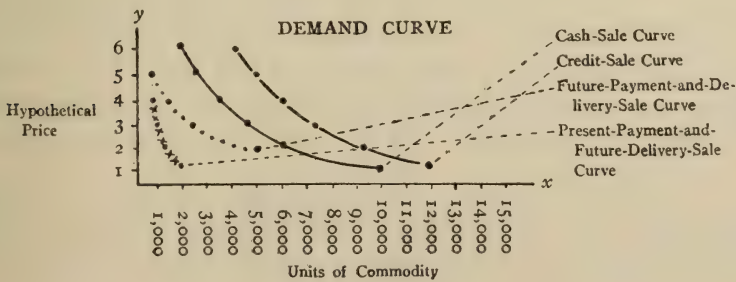
fall back upon provisional acceptance of the third solution mentioned earlier. According to this view, time, as it functions in the market, is neither an independent good nor an essential element of price or good. On the contrary, it is an integral and independently varying element of the market-bargain. From this standpoint a good has for the individual who contemplates purchasing or selling it varying degrees of utility, according to varying degrees of postponement of payment or delivery. Consequently, at any given hypothetical price the quantities of the good which the individual will be willing and able to bring forward as supply or to demand will vary with each variation in the time element, other things being equal. If this be true, the demand or supply of a commodity at any given hypothetical price will be represented by varying amounts as the time element varies. We are brought, in short, to look upon our cash-immediate delivery schedules illustrated on pages 47 and 48 as expressing one of a great variety of possible correlations of quantity price and time in connection with the demand and supply of a commodity, all of which together constitute the general demand and supply of the commodity in question at any given place and time. In short, we seem driven to the conclusion that the demand and supply of any commodity at any place and time must be represented by a series of schedules, each of which represents the amount of the commodity in question which prospective purchasers and sellers respectively are, or are imputed to be, willing and able to take and to offer at all possible hypothetical prices, in consideration of a specified time or times of delivery and payment.

In order to make this statement perfectly clear, and to furnish an unequivocal basis for the determination of the question whether or not we have really reached a true and final expression of market demand and supply, we must have concrete illustration. It is understood, of course, that, according to the view stated above, every possible essential variation in the bargain-time element results in a distinct demand or supply schedule variation. In order to make possible any practicable concrete illustration, then, we must make a selection of temporal market-bargain variations. Let us then select on the basis of bargain types.

A little consideration shows that there are at least four possible distinct types of bargains in the market resulting from variations in the time element. There is, first, the simple cash bargain—a purchase and sale on the terms of immediate payment and immediate delivery; secondly, the simple deal in futures—a purchase and sale for future delivery and future payment; thirdly, the credit sale, which calls for immediate delivery and future payment; and, fourthly, conceivably, a bargain which calls for immediate payment and future delivery. With the exception of the first, each of these types, as indicated above, is capable of infinite specific variation through variation in the extent of the time allowed for payment or delivery; but we may assume, for illustrative purposes, that each type is invariable. We obtain thus in the case of commodity x the following concrete illustration of our last conclusion in regard to the nature of demand and supply as correlations of the factors—quantity, price, and time:

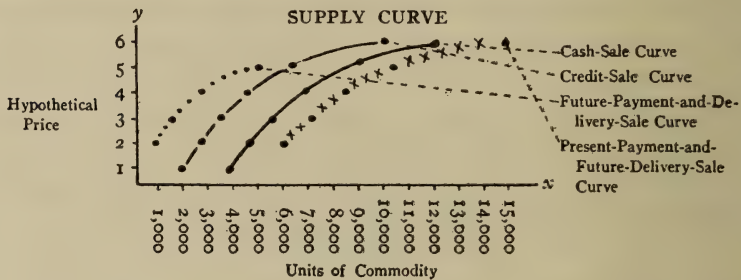
DEMAND SCHEDULE

HYPOTHETICAL PRICE	UNITS OF COMMODITY HYPOTHETICALLY TO BE TAKEN			
	Cash Sale	Future Payment and Delivery	Credit Sale	Present Payment and Future Delivery
1y	10,000x	.....	12,000x	2,000x
2y	7,000x	5,000x	9,000x	1,000x
3y	5,000x	2,000x	7,000x	500x
4y	3,500x	1,000x	5,500x	250x
5y	2,500x	600x	4,500x	.....
6y	2,000x	.....	4,000x	.....



SUPPLY SCHEDULE⁷

HYPOTHETICAL PRICE	UNITS OF COMMODITY HYPOTHETICALLY TO BE DISPOSED OF			
	Cash Sale	Future Payment and Delivery	Credit Sale	Present Payment and Future Delivery
1y.....	4,000x	.....	2,000x	.....
2y.....	4,500x	600x	2,500x	6,000x
3y.....	5,500x	1,000x	3,500x	7,000x
4y.....	7,000x	2,000x	5,000x	9,000x
5y.....	9,000x	5,000x	7,000x	12,000x
6y.....	12,000x	.....	10,000x	15,000x



By a process of exclusion we seem at last to have reached, then, a final conclusion in regard to the demand-and-supply potency of the bargain-time element. This conclusion must, however, be taken merely as provisional. The thoughtful reader will immediately be assailed with doubts as to the validity of the results attained. One of these sources of doubt may be easily eliminated, but others can be adequately discussed only in the sequel.

The query which may be at once disposed of is this: Is it not possible to unite in the one case the various schedules here assumed to represent demand, and in the other those assumed to represent supply, so that in each case we may have a single comprehensive and unified expression? Certainly the mind naturally strains toward this conclusion, and at first blush this seems to be a valid assumption. Careful examination, however, seems to show that such union is impossible. We may say, indeed, that altogether

⁷ It is understood, of course, that these schedules, represent only arbitrary portions of the actual demand and supply of a commodity. A complete representation would show the quantities taken and offered at all possible hypothetical prices and for all possible times of payment. It is also to be understood that the relation here taken between the amounts demanded or supplied and the corresponding basis is arbitrary.

these schedules represent total demand and supply for the commodity supposed to be in question. But when we attempt to go farther and affect their actual summation, we find at once that we are attempting to add discrete things. It is like trying to add four apples and five pears. To show this clearly, let us take the simplest illustration.

Suppose that at the hypothetical price, five cents, the demand for x could be represented thus :

Ten units where cash is to be paid and delivery is to be immediate.

Twelve units where three months' credit is to be allowed and delivery is to be immediate.

Eight units where cash is to be paid and three months is to be allowed for delivery.

Eleven units where three months' credit is to be allowed and delivery is to be three months postponed.

A mere glance at this concrete example shows that here we have three distinct elements to consider, and it is manifestly impossible to represent their combined results in a two-element schedule, unless we can find a method of reducing the third element to terms of one of the others. If the preceding argument has been followed, the impossibility of this reduction will not be doubted. These schedules, then, must be regarded as independent and irreducible. In this view no single and unified expression of total demand and supply is possible.

It should now be obvious that the result which we have reached is altogether incompatible with the naïve assumptions which have been current in economic discussion in regard to the nature of demand and supply, and the simplicity of the manner in which they determine the price of any commodity. In consequence, we should assign these assumptions to the limbo of once useful, but now outworn, machinery of discussion. But conceding this does not necessarily stamp with approval the machinery which we have installed. Indeed, if the demand and supply of a commodity are to be represented at any time and place by the irreducible schedules which we have constructed, and if it is still to be postulated that demand and supply determine price, the question how this result is accomplished presents a most complicated aspect, which at once involves us in a

serious dilemma and casts the gravest doubt on the finality of our conclusion as an expression of *specific* market demand and supply. Do these irreducible schedules altogether determine the market price of the commodity? If so, are all those representing respectively demand and supply of equal or of varying importance? How shall we determine the part played by each—their relative importance? But how, after all, is it possible to conceive of the process by which these distinct and irreducible schedules unite to determine a single market price? On the other hand, if we abandon the notion that demand and supply as a whole determine market price, must we not assume that each pair of schedules determines a price? If so, which of the various possible prices is *the* market price we are seeking? That is to say, which are *the* demand and supply of which economists have been so fond of discoursing?

Evidently, on the basis of our present conclusions, if we are to retain the demand-and-supply formula, we are driven to choose between two alternatives: (1) either we must reject the single-market-price theory and say that a given commodity may have a great number of prices in the same market at the same time; or (2) we must abandon what might be called the single-market theory and say that there are as many distinct markets for a commodity at a given time and within a so-called competitive area as there are distinct types of bargain based on differences in time of payment and of delivery. If we accept the second alternative, we abandon the notion that demand and supply as a whole at any time and within any so-called competitive area determine the price of a commodity, in favor of a specific demand-and-supply formula, assuming practically that each pair of irreducible demand-and-supply schedules represents the demand and supply of the commodity in a different specific market.

Intelligent choice between these alternatives can evidently be made only after a careful consideration of the nature of a market. We find ourselves, then, committed in the further prosecution of our problem, precedent to the discussion of the market process, to a study of the nature of markets, and the *specific* character of market demand and supply. In this study we shall be obliged,

among other things, to determine (1) to what extent, if at all, there may be various independent markets for the same commodity within a so-called market area, (2) whether or not the essential nature of a market varies with the character of a good, and (3) whether it is possible to find single universal expressions respectively for specific demand and supply in all markets and for all kinds of goods.

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